

Fig. 1

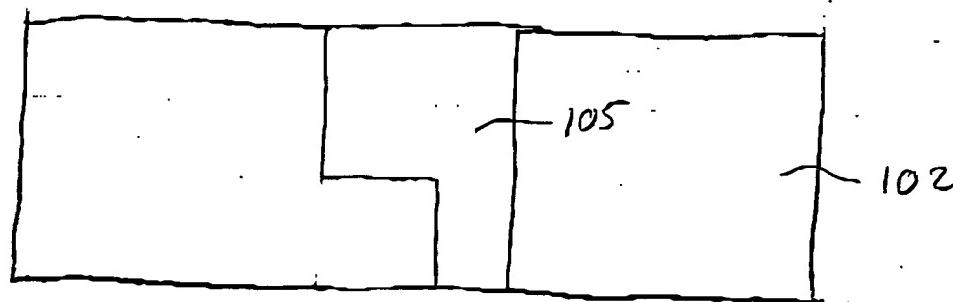


Fig. 2

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302

Form a copper layer overlying a patterned dielectric layer

304

Form a doped layer superjacent the copper layer

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Thermally drive dopants from doped layer into copper layer

Fig. 3

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502

Form a copper layer overlying a patterned dielectric layer

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Remove excess metal so as to form individual copper interconnect lines

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506

Implant dopants into at least the interconnect lines

Fig. 5

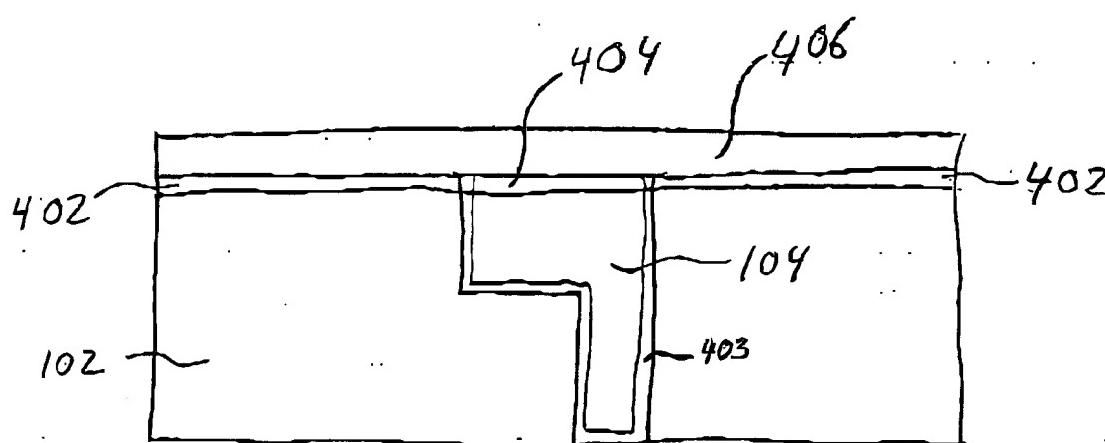


Fig. 4

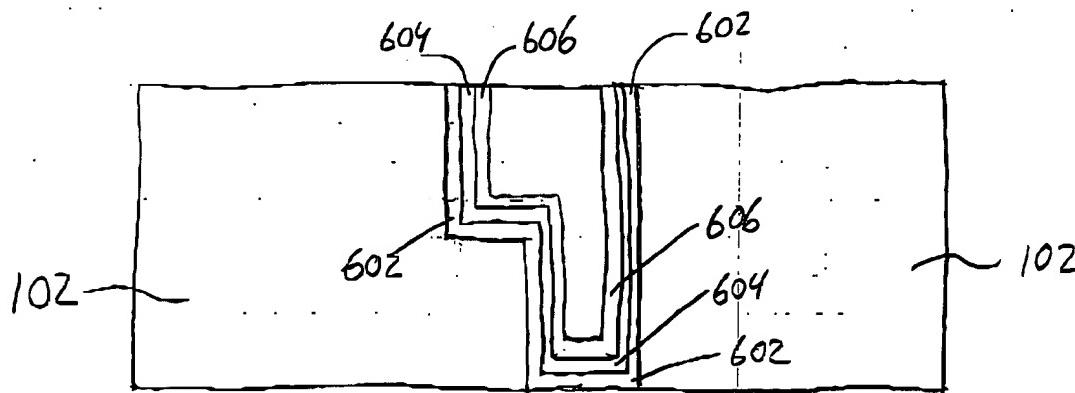


Fig. 6

PLATE 7

- 702
Pattern a dielectric layer to form at least trenches therein
- 704
Form a copper-diffusion barrier over the surfaces of the patterned dielectric
10 layer
- 706
Deposit a doped seed layer over the barrier layer
- 708
Deposit a capping layer over the doped seed layer without exposing the
15 doped seed layer to the atmosphere

Fig. 7

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- 802
Pattern a dielectric layer to form at least trenches therein
- 804
Form a copper diffusion barrier over the surfaces of the patterned dielectric layer
- 806
Deposit a doped seed layer over the barrier layer
- 808
Deposit a capping layer over the doped seed layer without exposing the doped seed layer to the atmosphere
- 810
Deposit a copper layer over the capping layer
- 812
Thermally drive dopants from doped seed layer to upper portions of copper layer while providing atmosphere that reacts with dopant species

Fig. 8